International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)
ISSN (P): 2249-6890; ISSN (E): 2249-8001
Vol. 8 Issue 5, Oct 2018, 427-436

A STUDY ON THE FACTORS INFLUENCING THE JOB STRESS OF PRODUCTION ENGINEERS IN THE AUTOMOBILE COMPANIES IN CHENNAI

J. RENGAMANI

Professor, AMET Business School, AMET University, India

ABSTRACT

Job Stress or Occupational Stress is considered to be the daily aspect of modern day work in the organizations. The job stress is an area which has been extensively researched around the world in the modern day industrial era. Most of the organizations around the world have started giving importance to job stress right from the operational level of management until the top level of management. Every researcher has dealt with the job stress to identify the occupational hazards that are prevailing in the work spot and the ways to mitigate them. One of the most important aspects of the employees working in an organization is the satisfaction level of employees towards the job and also towards the organization. The factor which is predominantly responsible for the job satisfaction would be the job stress. Specifically when the employees who are working as production engineers in the automobile companies and when they are incurred with the job stress then it will definitely affect the job satisfaction. Moreover, a dissatisfied production engineer will tend to change jobs which will lead to frequent attrition. There are many parameters which are directly and indirectly responsible for job stress of production engineers since they are made to do a variety of jobs. The production engineers who are working in automobile companies are incurred with more psychological stress than the physical stress. The multitude of factors tends to be those associated with psychological and social issues that are related to both personal and work lives. The aim of this study is to investigate the impact of the factors of job stress of production engineers in the automobile companies in Chennai.

KEYWORDS: Job Stress, Occupational Stress, Job Burnout, Stressors, Production Engineers, Automobile Companies & Health Hazards

Received: Jul 28, 2018; **Accepted:** Aug 18, 2018; **Published:** Sep 27, 2018; **Paper Id.:** IJMPERDOCT201848

Original Article

INTRODUCTION

Job Stress is an important aspect wherein every organization should have a serious consideration. Job Stress may be a part of physical stress, mental stress, psychological stress, social stress, psycho-social stress and management stress. Every type of stress should be considered in a serious manner because if the stress level is not brought down then the productivity of the employees will be reduced drastically. In order to increase the job satisfaction level of employees, the level of job stress should be minimized to the maximum extent otherwise it will have a serious impact on the productivity of the employees. The term 'stress' has a different meaning for researchers in various disciplines. The impact of job stress on the productivity of the job will be really drastic in nature. When the job stress is higher than the normal level then there is every possibility of the employees committing mistakes and the situation may end up in accidents which will be really detrimental to the day-to-day operation. The factors of stress or stressors must be carefully handled by the organization at the organizational

level and also at the individual level. The production engineers in the automobile companies will be facing challenging situation day in and day out apart from the routine work that is being carried out. The challenging situation will definitely put the production engineers in the stressful situation.

Researchers have propounded many theories to study the job stress based on many factors which are physical and psychological in nature. Job Stress of employees may be defined as the difficulty that dislocates or upsets the life and productivity of employee's physical and psychological disabilities. Actually, stress happens when the employees do something which is not normal or excess of the job description. As per the theories of job stress, the work environment in the organization plays a major role in the job stress of employees, that is, when the employees are not provided with the appropriate work environment then it may be really a tough task for the employees to accomplish the task allocated to them. This may drastically affect their performance in the organization. Most of the time, the employees are inducted to the stressful moment when the working conditions are not conducive to get things done. This becomes really predominant when the production engineers try to accomplish their task in the automobile companies since the nature of the job that they are supposed to achieve would require more physical and mental abilities. Moreover, the individual's psychology at work should match with the organizational psychology to achieve the set goals and accomplish the task on time. A stressed production engineer would definitely lose focus in accomplishing the task and subsequently, the production engineer will fail in the allocated duty. The job stress of employees will arise mostly from the organizational demands and the corresponding decision to be taken by the employees. If the organizational demands are high then the stress levels will also be high. The identification of stress's perspective is given more importance than to find a solution to the stress. This essentially means that not all stress factors will be based on the physical and psychological factors instead some of the factors may even depend on the social factors which must be given due importance by the organizations failing which the productivity of the employees will be badly affected.

The nature of the work of production engineers depends on the type of production work that is taken care of the organizations. Most of the production engineers must be in a position to get involved in the physical work and also the work related to decision making. The production engineers in the automobile companies work on the production plant or production factory. The major duty of the production engineers is to ensure whether the intermediate automobile parts are produced by following the benchmark of production techniques with the highest production quality and standards. The production engineers should ensure the adoption of the set procedures using the technology which is apt for the production of automobile parts and ultimately the finished automobiles. The production engineers are responsible for each and every aspect related to production in the factories. The production engineers are responsible for the activities related to research and development, change of design of automobile parts, procurement and maintenance of machines in the production floor, the investment to be made in the purchase of new machines and tools to keepup with updated technology, taking care of production line when the automobile parts are getting produced, checking and maintaining quality in the production of automobile parts, reduction of breakdowns in the production process and so on.

LITERATURE REVIEW

Gaganpreetkaur, Nandita Mishra & Puja Singhal (2018) specifies that the construction industry is the most important sector in the development of the country after the agriculture sector in India. Apart from this, it is the one which has been neglecting the laws which are to be followed for its safe working and has the minimum concern for the welfare of its workers. Construction industry constitutes the most perilous work, but the work in progress is being done in the most

precarious manner. This paper focuses on the lack of the safety measures which are neglected by these industries and the various occupational troubles which occur to the labor on the course of the work. A questionnaire was designed to be filled by the workers and a total of 236 respondents were interviewed from different construction sites of Delhi and NCR. Various questions in the context of the occupational safety, health and welfare measures were asked which were accompanied by open-ended questioned to know their sufferings in detail. After the application of various tests which were applied to the data, results came out to be worst as they were meant to be. Further various recommendations and suggestions were given in this paper which is based on the fieldwork and on the test as well.

Jian Li et al (2017) conducted research on Short and medium-term effectiveness (up to 3 years) of individual-level stress management interventions (SMI) at work were demonstrated, yet long-term effectiveness remains unexplored. We therefore, aimed to address this research gap. Methods. 94 male middle managers participated in a randomized wait-list controlled trial between 2006 and 2008 and in a post-trial-followup survey in 2015. During the first two years, all received an 18-hour psychotherapeutic SMI intervention which was based on the Effort-Reward Imbalance (ERI) model: tackling stressor on the mismatch between effort and reward and promoting recovery on over commitment. Work stress (i. e., ERI indicators) was the primary outcome, and the secondary outcome was depressive symptoms. The long-term effectiveness of the SMI was examined by mixed modeling, using an external control group (n = 94). R Effort and reward were substantially improved with significant intervention $*$ time interaction effects (p< 0.001) compared to the external control group; effects on over commitment and depressive symptoms were also significant (p< 0.05 and p< 0.01, resp.), though their trajectories in the intervention group were less sustainable. The effectiveness of this psychotherapeutic SMI at work based on the ERI model was observed over a 9-year period, particularly on the effort-reward ratio.

G. Sureshkrishna and Simanchala Das (2018) specifies that the work stress plays a key role in determining the level of job satisfaction of employees across the industries. Previous research shows that stress is an outcome of various factors like pressure from seniors, gender and age differences, continuous working with machines, working conditions, unfavorable environment, nature of work and salary. In recent years, employees in most of the industries experience tremendous stress and do not feel comfortable with their nature of the job. Many a studies has been undertaken to investigate the role of stress in job satisfaction of the employees. This paper examines the relationship between work stress and job satisfaction amongst the engineers in the automotive industry in India. A structured questionnaire was used on a sample of 190 engineers. The results revealed that some of the demographic variables were responsible for stress which showed a decline in the level of job satisfaction. The results also showed that the engineers who reported greater stress were less satisfied with their job and found to have a low level of job commitment and more likely to leave their jobs and less likely to adjust to the work environment.

Raja Zuraidah RM. Ras, et al (2014) specifies that the quest to obtain job satisfaction is not an easy task. Most of the time it will come together with job stress. Managing and handling job stress is a must and it is a challenging task. Able to control job stress will increase the productivity while failure to manage will lead to many problems in the workplace. A challenging career as an engineer usually leads to many types of job stress. Job stress is an unpleasant emotional situation that employee experience when the requirement of work-related or not related cannot be counterbalance with the ability to resolve them. Job stress has been identified by most of the academic researches as the factor which had contributed to higher or lower job satisfaction and performance. Issues like health problems, role

ambiguity, home interference as well as management role and work pressure are among the stress factors which have always been debated as most common problems. This study will examine the job stress factors that may impact the job satisfaction among engineers. The findings from this paper should be sufficient to conduct future research on the impact of job stress on job satisfaction among engineers or engineering industry.

Winter Gabriele, Schaub, Karlheinz, Landau, Kurt (2006) states that the assembly work and inspection and testing tasks tend to be combined nowadays in the automotive industry as a way of achieving job enrichment. Workers inspect and test parts manufactured or assembled by them. This is in addition to routine quality assurance activities. As well as introducing new sensory demands into the jobs, this integration of assembly and inspection activities also brings with it significant additional motor components, which lead to musculoskeletal strains. No empirical studies of the superimposed stresses involved in this type of job have been performed to date in the automotive industry. An ergonomically representative sample of work at 22 workstations shows that, whilst most of the work is performed close to the body and involves a substantial proportion of standing positions and strenuous forced postures, only relatively low levels of forces have to be applied. In contrast, tasks requiring the use of testing tools have to be performed farther from the body and higher forces have to be applied. The findings reported from this study led to the design of a screening procedure for the predominantly physical stresses arising in assembly and inspection work in the automotive industry.

Dehghan H, Mobinyzadeh V, Habibi P. (2016) specifies that the research aimed to study the relationship between heat stress indices with job satisfaction, job performance and job stress in casting workers. This descriptive-analytical cross-sectional survey was performed during summer 2013 on one hundred casting workers. Data were collected by questionnaires of occupational stress, job satisfaction, and job performance. Heat stress was measured by the Wet Bulb Globe Temperature (WBGT) and Heat Strain Score Index (HSSI) questionnaire. The study showed that heat stress had a negative effect on job satisfaction; also there were no significant effects on job stress and job performance.

Peters, J. (2013). The study on the work-load of Waldorf teachers is based upon six narrative interviews, conducted using an open design. Drawing upon the methodology of “Grounded Theory” it proved possible to identify personal commitment to the principle of individual responsibility as the central condition for coping positively with the stresses and strains of teaching. This basic attitude promotes not only self-efficacy but also awareness of one’s own contribution to challenging situations. For individual responsibility to be effective within the context of a school it must be reflected and supported at all levels of school organization.

Seyedeh Negar Assadi (2016) specifies that the study was to determine the effects of working in the automotive industry on renal function in Iran. Results are in three parts; demographic information, health information, and kidney risk factors. Workers had rotating shift work. Exposure assessment for lead, cadmium, and solvents showed that the means of exposures levels were in permissible level.

S. T. Surulivel, R. Alamelu, and S. Selvabaskar (2014) specify that the research was conducted to know the stress level of women employees of Indian BPO companies. Generally, women employees will face stress because of various factors such as physical environment, organizational factor, interpersonal factor, family satisfaction, personal satisfaction and job satisfaction etc. This paper empirically evaluated the stress and the causes of stress and its management activities. Stress management is defined as causes of stress and its prevention techniques. These stress management also involved individual to overcome Stressors. The research study is based on the primary data for a period of 2013-2014. This research chooses 200 women employees of BPO companies as the subject and collects data by simple random

sampling method. Data was obtained through survey questionnaires. The result obtained was analyzed. The study identified that employees are experiencing a high degree of stress with respect to physical & psychological working condition of the organization and training programs conducted by the organization.

RESEARCH OBJECTIVES

The objectives of the study are specified below:

- To study the factors involved in the job stress of the production engineers in the automotive companies in Chennai.
- To investigate the mean differences of the work-related stressors.

RESEARCH HYPOTHESIS

In order to achieve the objectives, this article is organized around the following working hypotheses:

- **H_1:** There is a significant difference in the mean values of individual work-related stress factors of production engineers.
- **H_2:** There is a significant difference in the mean values of stressors of production engineers.

METHODOLOGY

The population was considered as production engineers who were working at various levels/job categories in the automobile companies in Chennai. The researcher has taken a sample size of 385 respondents who are working in the automobile companies on the production floor. The sample size was decided based on the formula proposed by Cochran (1963) at 5% level of significance. The details are given below:

$$n = \frac{Z^2.p.q}{e^2}$$

Z is the level of confidence

p is the true proportion of success

e is the error permitted

The sample responses were obtained by using stratified random sampling. The job stress of production engineers in the automobile companies was measured by a five-point scale (Likert scale) from1 (Strongly disagree) to 5 (Strongly agree). The structured questionnaire was initially tested by using a pilot study and then based on the results obtained through pilot study; the updated questionnaire was circulated to 450 respondents who were working in the production floor of the automobile companies in and around Chennai. 411 samples were obtained back from the respondents and finally, 385 sample respondents were used for further study discarding incomplete questionnaires. The conceptual model consists of the constructs of the factors of the stress (stressors) such as Physical stressors, Psychosocial stressors, Social stressors, High work demand, and High management tasks. The production engineers who are working in the automobile companies are faced with the stress factors as specified in the conceptual model (Figure 1)

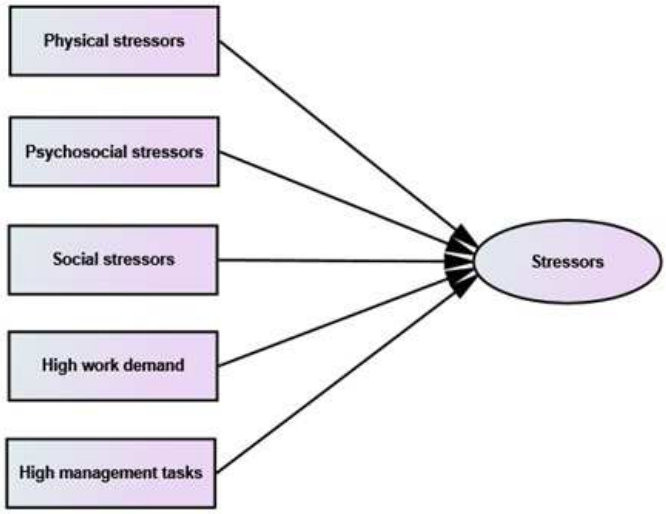

Figure 1: Conceptual Model of the Factors of Stress (Source: Respondents Survey)

DATA ANALYSIS

The demographic factors (Table 1) of the study specify that 84% of the respondents are male production engineers and 31% of the age of the respondents fall under the age category of 40-50 years. 61% of the respondents have acquired the educational qualifications equivalent to graduation and 39% of the respondents have the experience of 10-15 years. 51% of the respondents had the habit of doing the exercise once in a week and 64% of the respondents had the habit of sleeping for less than 5 hours.

Table 1: Demographic Factors

Demographic Factors	Frequency	Percentage
Gender		
Male	324	84
Female	61	16
Age		
Below 30	76	20
30-40	95	25
40-50	121	31
50-60	66	17
Above 60	27	7
Education		
Diploma	81	21
Graduation	233	61
Post-graduation	52	14
Others	19	5
Experience		
Below 5 years	52	14
5-10 years	95	25
10-15 years	152	39
15-20 years	72	19
Above 20 years	14	4
Exercise Habit		
Everyday	85	22
Once in week	195	51
Whenever possible	94	24

Table 1: Contd.,		
Never	11	3
Sleeping Pattern		
Below 5 hours	245	64
5 – 8 hours	132	34
Above 8 hours	8	2

In the beginning of the study, the Cronbach's alpha values of mental strain of employees, lack of self-confidence of employees, lack of rewards to be given to employees, the social interaction of employees, the threat feeling of employees, rewards, physical inabilities of employees, poor working conditions, lack of support from the peers and the poor sense of responsibility are reasonably high with the alpha values of 0.91, 0.89, 0.94, 0.82, 0.81, 0.88, 0.93, 0.92 and 0.91 respectively.

The result of the Questionnaire survey regarding the job-related stress of the production engineers in the automobile companies shows that the p-values of all the stress factors (stressors) are less than 0.05 (Table 2).

Table 2: Significance of Mean Values of Individual Stress Factors Examined by Student's t-test (Significance Level = 0.05)

Stress Factors	t	p
Mental strain of accomplishing the set-task	2.01	0.005
Lack of rewards for accomplishment	2.03	0.002
Lack of self-confidence to work	2.05	0.009
Social relations	1.88	0.004
Feeling of threat	1.68	0.019
Physical oppressiveness	2.46	0.022
Unpleasant work conditions	2.66	0.016
Lack of support	2.46	0.014
Sense of responsibility	2.32	0.013

In the next part of the study, it can be inferred that the Cronbach's alpha values of the factors based on physical stress, psychosocial stress, social stress, high work demand, and high management tasks are also reasonably high with the alpha values of 0.88, 0.97, 0.93, 0.92 and 0.91 respectively

Table 3: One Way ANOVA of the Factors of Stress

Stress Factors (Stressors)	F-Values	p-values
Physical Stressors		
Heat in workplaces	4.21	0.002
Excessive Noise	3.82	0.012
Vibration	3.62	0.011
Hard physical work, lifting, carrying	3.71	0.008
Lack of exercise	3.42	0.009
Psychosocial Stressors		
Change of Shift	4.61	0.002
Long working times per day	4.53	0.006
Irregular working times	4.52	0.015
Lack of sleep	3.89	0.014
Social Stressors		
Separation from the family	4.89	0.013
Lack of Interaction	4.87	0.019
Conflicts between peers	4.53	0.022
Isolation	4.82	0.021

Table 3: Contd.,		
High Job Demand		
Time pressure, hectic activities	3.89	0.002
High volume of work	4.99	0.004
High responsibility for the own activities	4.62	0.006
Pressure due to decision-making	4.23	0.001
Monotony	3.44	0.001
Lack of independence	3.21	0.015
High Management Tasks		
Insufficient qualification of subordinates	4.56	0.015
High responsibility	4.83	0.009

The respondent's data was analyzed by using one-way Analysis of Variance (ANOVA) to test the hypotheses. Based on the results specified in Table 3, it can be identified that all p-values of the stress factors are less than 0.05. This signifies that there is a significant difference in the mean values of the factors of stress.

The physical stressors such as heat in workplaces, excessive noise, vibration, hard physical work, lifting, carrying, lack of exercise in the everyday routine are considered as the most vital factors in influencing the level of stress. The psychosocial stressors such as change of shift, long working times per day, irregular working times, lack of sleep would actually put the production engineers in great stress. The factors of job stress will ultimately lead to fatigue and job burnout which are considered to be really dangerous on the production floor of automobile companies. Since when the employees commit the slightest mistake then it may lead to the faulty production of automobile parts and the entire production lot will have to go as scrap which will lead to financial loss to the organization. The social stressors or problems due to migration such as separation from the family, lack of interaction, conflicts between peers and isolation will enable the respondents to completely delink from the social life and it will put the respondents under high stress. The high job demand such as time pressure, hectic activities, high volume of work, high responsibility for the own activities, pressure due to decision-making, monotony, lack of independence are considered as the most important factors of stress.

CONCLUSIONS

The stress experienced by the production engineers in the automobile companies may be due to a set of factors related to stress incurred by them while at work. The job stress may be psychological, emotional, social, and occupational or job-related. The production engineers may be affected due to a number of factors of stress such as poor working condition, excessive workload, shift work, long hours of work, role ambiguity, role conflicts, poor relationships, with the boss, colleagues or subordinate officers, risk and danger of accomplishing a task, to mention a few. Most of the factors of stress may be related to psychological in nature since the production engineers could withstand the physical stress much more than the mental stress. Even though the physical factors of stress such as body ache, headache, lack of sleep, lack of rest, lack of concentration in the work will contribute to the higher stress levels, the factors of stress related to mental strain is more predominant in the case of production engineers who work on the production floor of automobile companies. The study reveals that the production engineers in the automobile companies are typically exposed to dangerous work methods, heat producing machinery & equipment, fire, shock, excessive noise, fumes, and other related hazardous factors. Job stress can impair the production engineer's performance at work, reduce their alertness, and affect their problem-solving and decision-making abilities. Production engineers under excessive stress may tend to showcase low morale towards the work

and in turn, the productivity level will be drastically reduced. When the stress levels are high among production engineers, it will have a direct impact on the job satisfaction level as well. The job stress will also encompass the factors related to peer-pressure and also the pressure imposed by the superiors in the organization. The job stress can be reduced among production engineers by providing appropriate training on stress management.

REFERENCES

1. *Abdul Raziqa, Raheela Maulabakhsha, Impact of Working Environment on Job Satisfaction, Procedia Economics and Finance, 2015, 717 – 725.*
2. *Arnold, J., C. L. Cooper and I. T. Robertson. 1995. Work Psychology: Understanding Human Behaviour in the Work Place. London: Pitman Publishing.*
3. *Aziz, (2004). Role stress among women in the Indian IT sector. Women in Management Review.*
4. *Baum, A., R. J. Gatchel and D. S. Krantz. 1997. An Introduction to Health Psychology. New York: The McGraw-Hill Companies, Inc.*
5. *Danica Bakotić, Tomislav Babić, Relationship between Working Conditions and Job Satisfaction: The Case of Croatian Shipbuilding Company International Journal of Business and Social Science in Vol. 4 No. 2; February 2013.*
6. *Dehghan H, Mobinyzadeh V, Habibi P. The Effects of Heat Stress on Job Satisfaction, Job Performance and Occupational Stress in Casting Workers, Jundishapur J Health Sci. 2016; 8(3):e36192. doi: 10.17795/jjhs-36192.*
7. *Friedlander, F. and Margulies, N. (1969). Multiple Impacts of Organization Climate and Individual Values System upon Job Satisfaction, Personnel Psychology.*
8. *G. Sureshkrishna and Simanchala Das, Occupational Stress and Job Satisfaction: A Study of Automotive Industry in India, International Journal of Mechanical Engineering and Technology 9(2), 2018, pp. 690–697.*
9. *Gaganpreetkaur, Nandita Mishra & Puja Singhal, Concern of Construction Industry towards Occupational Safety and Health Issues, International Journal of Mechanical and Production, Engineering Research and Development (IJMPERD), ISSN (P): 2249-6890; ISSN (E): 2249-8001, Vol. 8, Issue 3, Jun 2018, 615-622*
10. *Ganster, Daniel & Schaubroeck, John. (1991). Work Stress and Employee Health. Journal of Management - J MANAGE. 17. 235-271.*
11. *Jezewska M, Leszczynska I, Jaremin B. Workrelated stress at sea. Self-estimation by maritime students and officers. Int Marit Health 2006.*
12. *Jian Li, Natalie Riedel, Amira Barrech, Raphael M. Herr, Birgit Aust, Kathrin Mörtl, Johannes Siegrist, Harald Gündel, Peter Angerer (2017), Long-Term Effectiveness of a Stress Management Intervention at Work: A 9-Year Follow-Up Study Based on a Randomized Wait-List Controlled Trial in Male Managers, Biomed Research International, 2017*
13. *Kahn and Byosiere, (1992), Organizational stress: Studies in role conflict and ambiguity. New york: Wiley.*
14. *Karasek RA, Theorell T. Healthy work-stress, productivity, and the reconstruction of working life. New York (NY): Basic Books; 1990.*
15. *Karasek. R and Theorell. T, (1990) "Healthy work, stress productivity and the reconstruction of working life", USA Basic books*
16. *Lazarus, R. S. 1966. Psychological Stress and the Coping Process. New York: McGraw-Hill.*

17. *Patchiappane, M., Rengamani, J., A study on the job satisfaction and job burn out of indian marine engineers, International Journal of Civil Engineering and Technology, 2017.*

18. *Paul Spector, 2002; Cross national differences in relationships of work demands, job satisfaction, and turnover intentions with work family conflict. Personnel Psychology.*

19. *Peters, J. (2013). Workload, Stress and Job satisfaction among Waldorf teachers: An Explorative Study. RoSE – Research on Steiner Education. Vol 3, No.2 Pg 111-117. ISSN 1891-6511.*

20. *Raja Zuraidah RM. Ras, et al (2014), The Impact of Job Stress to Job Satisfaction among Engineers: A Literature Review, International Conference on Industrial Engineering and Operations Management, Bali, Indonesia, Jan 7-9, 2014*

21. *Rajasekar, D., Prasad, B. V., Employee job satisfaction and intention to attrition- An empirical analysis, International Journal of Mechanical Engineering and Technology, 2017.*

22. *Rajasekar, D., Premkumar, R., A study on motivation level of employees in automobile industry, International Journal of Mechanical Engineering and Technology, 2017.*

23. *Rengamani, J., Poongavanam, S., Shameem, A., Assessing the job stress of indian seafarers' based on job demand control model, International Journal of Mechanical Engineering and Technology, 2017.*

24. *Rengamani, J., Shameem, A., A study on the factors influencing the occupational stress of Indian seafarers, International Journal of Mechanical Engineering and Technology, 2017.*

25. *Rengamani, J., Shameem, A., Poongavanam, S., An empirical analysis of the factors affecting the work stress of Indian mariners, International Journal of Civil Engineering and Technology, 2017.*

26. *Rodrigueze RA, Hernandez GT. Renal toxicology. In: La Dou J, editor. Current Occupational and Environmental Medicine. Vol. 4. New York: MacGraw-Hill; 2007. pp. 363–72.*

27. *S. T. Surulivel, R. Alamelu and S. Selvabaskar, "A study on work-place stress and its management — A Structural Equation Model (SEM) approach," 2014 International Conference on Science Engineering and Management Research (ICSEMR), Chennai, 2014, pp. 1-5.*

28. *Seyedeh Negar Assadi, Is a Long Term Work in Automotive Industry a Risk Factor for Renal Dysfunction?, Annals of Medical and Health Sciences Research, 2015*

29. *Tawatsupa B, Lim LL, Kjellstrom T, Seubsman SA, Sleigh A. Thai Cohort Study Team. Association between occupational heat stress and kidney disease among 37,816 workers in the Thai Cohort Study (TCS) J Epidemiol. 2012; 22:251–60.*

30. *Winter Gabriele, Schaub, Karlheinz, Landau, Kurt, Stress screening procedure for the automotive industry: Development and application of screening procedures in assembly and quality control, Occupational Ergonomics, vol. 6, no. 2, pp. 107-120, 2006*

31. *Hacene, E., Malika, M., Fateh, B., & Abdelkader, D. B. Production Of Lactic Acid From Cheese Whey By Immobilized Cell Reactor Of Strain Lactococcus Lactis Subsp Lactis Sp1 Adsorbed Onto Pozzolana Bed.*